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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/517,090	08/30/2005	Michail Tsatsanis	VOY-023US	1123

26875 7590 05/30/2007	EXAMINER
WOOD, HERRON & EVANS, LLP	AHN, SAM K
2700 CAREW TOWER	

ART UNIT	PAPER NUMBER
2611	

441 VINE STREET
CINCINNATI, OH 45202

MAIL DATE	DELIVERY MODE
05/30/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

	Application No.	Applicant(s)
Office Action Summary	10/517,090	TSATSANIS ET AL.
	Examiner	Art Unit	
	Sam K. Ahn	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>26 March 2007</u>.

2a) ☒ This action is **FINAL**.   2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) <u>3,5-12,15,17-24,27,29-36,39 and 41-57</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☒ Claim(s) <u>8-12,20-24,32-36 and 45-47</u> is/are allowed.

6) ☒ Claim(s) <u>3,5-7,15,17-19,27,29-31,39,41,42 and 48-57</u> is/are rejected.

7) ☒ Claim(s) <u>43 and 44</u> is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on <u>06 December 2004</u> is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All   b) ☐ Some *   c) ☐ None of:

      1. ☐ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____.

      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Oath/Declaration

1. The oath or declaration is defective. A new oath or declaration in compliance with

37 CFR 1.67(a) identifying this application by application number and filing date is

required. See MPEP §§ 602.01 and 602.02.

> The oath or declaration is defective because:
> It does not identify the citizenship of each inventor (<u>note the first inventor,
> including missing signature, and date</u>).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 3,5-7,15,17-19,27,29-31,39,41,42,48,52,53 and 57 are rejected under 35

U.S.C. 103(a) as being unpatentable over Amrany et al. US 6,999,504 B1 (Amrany)

in view of Polley et al. US 5,999,563 (Polley, cited in the IDS) and Kantschuk et al.

US 7,046,751 B1 (Kantschuk, cited previously).

Regarding claim 48, Amrany teaches a method comprising: creating a

communications line with two or more twisted copper pairs of wire in one or more

binders (see Fig.2A with plurality of twisted wires for 102-110 in one binder of a

bundle); coordinating physical-layer signals across two or more receivers;

coordinating the physical-layer signals across two or more transmitters (see CP1

– CPn in Fig.2A communicating signals with CO 114, wherein CO comprising

xDSL1 – xDSLn modems, see within 42 in Fig.1); further teaches exploiting

measured interference noise values across two or more of said receivers to

reduce interference noise in the physical layer signals, wherein the reduced

interference noise includes out of domain components of interference noise

(wherein the reduced interference noise takes the form closer to a transmitted

signal, wherein Amrany teaches that the transmitted signal is derived by

subtracting the crosstalk noise from the received signal, note c.8, l.21-24, and

further the crosstalk noise includes white noise, note c.8, l.10-18, hence reduced

interference noise is performed by pre-processing p(n), note c.8, l.52, wherein

p(n) also includes white noise w(n), note equation 2, and wherein one skilled in

the art would recognize that white noise is noise out of domain component of

interference noise).

However, Amrany does not explicitly teach wherein the signals are physical layer

signals.

Polley teaches a method comprising: creating a communications line with two or

more twisted copper pairs of wire in one or more binders (see Fig. 6b having

twisted pairs A and B 140 in one binder of telephone subscriber cable); receiving

from said two or more twisted pairs across two or more receivers physical layer

signals (each of the twisted pairs A and B receiving and transmitting physical

layer signals 185 in Fig.1e) that have been coordinated across two or more

transmitters (wherein the modem in illustrated in Fig.14a comprising transmitters

and receivers communicating with modems on the other side of the twisted pairs

A and B). And although Polley further teaches NEXT (near-end crosstalk

interferences) cancellation, Polley does not explicitly teach exploiting a

correlation between measured interference noise values across two or more of

said receivers to reduce interference noise in the physical layer signals.

However, Amrany in view of Polley does not explicitly teach exploiting a

correlation or comparison between measured interference noise values across

two or more of said receivers to reduce interference noise in the physical layer

signals.

Kantschuk teaches in the same filed of endeavor of twisted pairs of wire in a

binder or shared cable (18 in Fig.1) coupling modem pools in both ends of the

cable. Kantschuk further teaches exploiting a correlation between measured

interference noise values (comparing among A-P disturber modems causing

greatest NEXT interference, note col.8, lines 45-48, the measured NEXT

interference values note col.7, lines 37-45) across two or more of receivers

(receivers in modems of 12 or 10 in Fig.1) to reduce interference noise (applying

probe filters to modems with NEXT disturber, hence reduces NEXT interference,

note col.8, lines 35-48) in the signals across the twisted pairs. Hence, both

Amrany and Kantschuk teach modem pools transmitting and receiving signals

and suffering from NEXT interference. Kantschuk further teaches that dynamic

allocation of NEXT cancellation filters in the modem pool environment adapts to

environment conditions and the physical behavior of copper pairs (note col.2,

lines 36-45), wherein one skilled in the art at the time the invention was made

would recognize based on the teaching of Polley that the signals across the

copper pairs are also physical layer signals. Therefore, it would have been

obvious to one skilled in the art at the time the invention was made to incorporate

the teaching of Kantschuk in the system of Amrany of applying the NEXT

cancellation filters to reduce NEXT interference in the modem pool for the

purpose of reducing interference by adapting to environment conditions and the

physical behavior of copper pairs (note col.2, lines 36-45).

Regarding claim 52, the claim is rejected as applied to claim 48 with similar

scope.

Regarding claim 53, the claim is rejected as applied to claim 48 with similar

scope.

Regarding claim 57, the claim is rejected as applied to claim 48 with similar

scope.

Regarding claim 3, Polley further teaches wherein the interference noise includes

crosstalk noise (NEXT: Near-end crosstalk noise, note col.41, line 45-59) from

high-bitrate services (ADSL service supporting 6Mbps downstream, note col.2,

lines 21-24) in the one or more binders (see Fig. 6b having twisted pairs A and B

140 in one binder of telephone subscriber cable).

Regarding claim 5, Polley further teaches wherein the two or more receivers and

two or more transmitters (wherein the modem in illustrated in Fig.14a comprising

transmitters and receivers communicating with modems on the other side of the

twisted pairs A and B) utilize a Discrete Multi-Tone architecture having one or

more frequency bins (DMT, note col.4, lines 42-44, wherein one skilled in the art

at the time the invention was made would recognize that DMT schemes employ

plurality of frequency bins or channels separated by different frequency

bandwidths, which is well-known to one skilled in the art).

Regarding claim 6, Polley further teaches wherein the receiving physical-layer

signals across two or more receivers (each of the twisted pairs A and B receiving

and transmitting physical layer signals 185 in Fig.1e) is performed in a frequency

domain (see Fig.13a wherein upstream and downstream channels or channels

for transmitting and receiving are in frequency domain), independently for each

frequency bin of the one or more frequency bins (wherein one skilled in the art at

the time the invention was made would recognize that DMT scheme employs

plurality of channels or frequency bins wherein each of the channels have its own

data independent from its neighboring channels, which is well-known in the art).

Regarding claim 7, Polley further teaches wherein the receiving physical-layer

signals across two or more transmitters (each of the twisted pairs A and B

receiving and transmitting physical layer signals 185 in Fig.1e) is performed in a

frequency domain (see Fig.13a wherein upstream and downstream channels or

channels for transmitting and receiving are in frequency domain), independently

for each frequency bin of the one or more frequency bins (wherein one skilled in

the art at the time the invention was made would recognize that DMT scheme

employs plurality of channels or frequency bins wherein each of the channels

have its own data independent from its neighboring channels, which is well-

known in the art).

Regarding claim 15, the claim is rejected as applied to claim 3 with similar scope.

Assuming that claim 17 depends on claim 13 (*note Claim objections above*), the

claim is rejected as applied to claim 5 with similar scope.

Regarding claim 18, the claim is rejected as applied to claim 6 with similar scope.

Regarding claim 19, the claim is rejected as applied to claim 7 with similar scope.

Regarding claim 27, the claim is rejected as applied to claim 3 with similar scope.

Regarding claim 29, the claim is rejected as applied to claim 5 with similar scope.

Regarding claim 30, the claim is rejected as applied to claim 6 with similar scope.

Regarding claim 31, the claim is rejected as applied to claim 7 with similar scope.

Regarding claim 39, the claim is rejected as applied to claim 3 with similar scope.

Regarding claim 41, the claim is rejected as applied to claim 5 with similar scope.

Regarding claim 42, the claim is rejected as applied to claim 6 with similar scope.

3. Claims 49-51 and 54-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Amrany et al. US 6,999,504 B1 (Amrany) in view of Polley et al. US 5,999,563 (Polley, cited in the IDS) and Kantschuk et al. US 7,046,751 B1 (Kantschuk, cited previously).and in further view of Ginis et al. US 2003/0086514 A1 (Ginis).

Regarding claim 49, Amrany in view of Polley and Kantschuk teaches all subject matter claimed, as applied to claim 48, however, does not explicitly teach multiplying a transmitted symbol vector at the transmitters by a pre-processing matrix to generate multiplied transmitted vectors.

Ginis teaches communication between plurality of transmitter and receivers (see Figs.1 and 2) experiencing crosstalk noises and further teaches multiplying a transmitted symbol vector at the transmitters by a pre-processing matrix to generate multiplied transmitted vectors (note paragraph 0122 wherein the signal to be transmitted of vector NL is multiplied by a permutation matrix P). Ginis

further suggests computation explained provides further processing by stacking in groups corresponding to tones and different users (note paragraph 0122). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to incorporate the teaching of Ginis in the transmitter of Amrany by a pre-processing matrix to generate multiplied transmitted vectors (note paragraph 0122 wherein the signal to be transmitted of vector NL is multiplied by a permutation matrix P) as taught by Ginis for the purpose of further processing by stacking in groups corresponding to tones and different users (note paragraph 0122).

Regarding claim 50, Ginis further teaches that multiplication with a matrix is performed at the receiver (note paragraph 0122). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to incorporate the teaching of Ginis in the receiver of Amrany by a post-processing matrix (note paragraph 0122 wherein the signal received is multiplied by a permutation matrix P) as taught by Ginis for the purpose of further processing by stacking in groups corresponding to tones and different users (note paragraph 0122).

Regarding claim 51, Amrany in view of Kantschuk teaches all subject matter claimed, as applied to claim 48, however, does not explicitly teach multiplying a received symbols at the receivers by a post-processing matrix.

Ginis teaches communication between plurality of transmitter and receivers (see Figs.1 and 2) and further teaches that multiplication with a matrix is performed at the receiver (note paragraph 0122). Ginis further suggests computation explained provides further processing by stacking in groups corresponding to tones and different users (note paragraph 0122). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to incorporate the teaching of Ginis in the receiver of Amrany by a post-processing matrix (note paragraph 0122 wherein the signal received is multiplied by a permutation matrix P) as taught by Ginis for the purpose of further processing by stacking in groups corresponding to tones and different users (note paragraph 0122).

Regarding claim 54, the claim is rejected as applied to claim 49 with similar scope.

Regarding claim 55, the claim is rejected as applied to claim 50 with similar scope.

Regarding claim 56, the claim is rejected as applied to claim 51 with similar scope.

Allowable Subject Matter

4. Claims 8-12,20-24,32-36 and 45-47 are allowed.

5. Claims 43 and 44 are objected to as being dependent upon a rejected base claim,

but would be allowable if rewritten in independent form including all of the limitations

of the base claim and any intervening claims.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this

Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37

CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire

THREE MONTHS from the mailing date of this action. In the event a first reply is

filed within TWO MONTHS of the mailing date of this final action and the advisory

action is not mailed until after the end of the THREE-MONTH shortened statutory

period, then the shortened statutory period will expire on the date the advisory action

is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from

the mailing date of the advisory action. In no event, however, will the statutory

period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from
the examiner should be directed to Sam Ahn whose telephone number is (571)
272-3044. The examiner can normally be reached on Monday-Friday.
If attempts to reach the examiner by telephone are unsuccessful, the
examiner's supervisor, Mohammad Ghayour can be reached on (571) 272-3021.
The fax phone number for the organization where this application or proceeding
is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Khanh cong Tran   05/29/07

KHANH   TRAN

Primary Examiner

Sam K. Ahn
Patent Examiner

5/16/07